Big Data Strategies - how can railways organise to maximise benefit

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A smarter railway system provides the opportunity to deliver higher performance at lower cost

Benefits from big data and digitalisation

- Higher capacity
- Greater reliability
- More safety
- Greater availability
- Value for money
  - Lower maintenance costs
  - Less investment
  - Higher yield from uplift in capacity
- Improved punctuality
- Better communications
- Lower maintenance costs
- Less investment
- Higher yield from uplift in capacity

Value for money:
- Lower maintenance costs
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Improved punctuality:
- Higher reliability
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Better communications:
- Higher reliability
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This presentation draws on the findings of two benchmarking studies carried out by civity with Network Rail in 2018.

Context

**Big Data study**
- Aim was to understand if current approach and future plans are in line with good practice in other organisations and support set up for the effective and productive use of (big) data

**Whole System Modelling**
- Purpose was to understand how rail companies and organisations from different industry sectors undertake their modelling & simulation and to identify best practices
The two studies comprised eleven participants, from eight countries and six industry sectors across Europe
Based on the findings of the studies, we have focused this presentation on six key themes

Key themes

1. Strategy
2. Organisation
3. Data
4. People & Culture
5. Management of change
6. Continuous improvement
A holistic strategy for big data, analytics and modelling is required, which still leaves room for innovation

Findings - Strategy

Conclusions

- Holistic strategy for (big) data, analytics and modelling
- Framework should allow for innovation according to business needs
- Contribute to business need and overall strategy
- Communicate the value and necessity of an effective data strategy
Network Rail has a major programme using data to improve understanding and management of its assets

Network Rail - Strategy

Intelligent Infrastructure Programme Scope
Key question is around suitable structures to combine data driven culture with traditional needs

Findings - Organisation

Conclusions
- Combine dynamic data driven culture with traditional needs
- Possible models:
  - using integrated teams
  - internal separate “start-up” like business units
  - partnering with external organisations
Network Rail is collaborating with a mix of start-ups, academia and big IT companies.
Good data governance is needed in order to use big data efficiently

Findings – Data

Conclusions

- Company wide data governance framework describing the overall management of
  - availability, usability, integrity and security of data
- Dedicated team for overall data management
- Effective use of data
- Key question: What comes first – data or analytical need?
- IT function to provide Application Programmable Interfaces (APIs) that make data available to analysts
- Analysis moves from “Managed Service” to “Self-Service”
- IOT requires highly scalable “real-time” data distribution services
People are key when it comes to maximising the benefits from big data

Findings – People and culture

Conclusions

- People are key to the success of digitalisation
- Need to integrate new types of people and new skills into existing business and knowledge
- Ensure that leaders/guiding minds in their function as experts are approachable
- Foster internal exchange
Network Rail – People and culture

- Leverage STEM networks & university partnerships to attract graduates in mathematics, science, computing & software.
- Cross-organisation structured competence framework.
- Retain talent through stretch assignments and secondment.
- “Analytics community” initiatives.
- Managed frameworks
- R&D challenge statements to access niche suppliers

The Big Data Dilemma states

“No Digital Strategy will succeed without immediate action to tackle the crisis of our digital skills shortage…The digital skills gap is approaching crisis levels… and the wider set of ‘Big Data’ skills is not being strategically addressed. This risks UK business being unable to grow the Big Data sector at the pace it should.”
Embrace change as a ‘business as usual activity’

Findings – Management of change

Conclusions

- Business change is as much of a ‘business as usual’ activity as any other, plan and resource for it
- Establish a culture open for change
- Open-minded employees are needed at all levels
- Instigate internal and external exchange

“What if we don’t change at all ... and something magical just happens?”
We have identified six key conclusions which are essential to deliver benefit from the opportunities offered by big data

<table>
<thead>
<tr>
<th>Conclusions</th>
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<tbody>
<tr>
<td>▪ Wholistic strategy for data, analytics and modelling</td>
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<td>▪ Value and necessity of these should be communicated and understood</td>
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<td>▪ Railways need to set up organisations that can take advantage of the opportunities and face the challenges that data offers</td>
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<td>▪ Good data governance</td>
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<td>▪ Effective use of data</td>
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<td>▪ Ensure data is organised and made available as appropriate</td>
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<td>▪ People are key</td>
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<td>▪ Focus on bringing together traditional rail knowledge and new capabilities and skills</td>
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<td>▪ A state of change is now ‘business as usual’</td>
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<td>▪ We need to organise, plan and resource for it</td>
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<td>▪ We will only be successful if we work together as an industry</td>
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<td>▪ And reach outside and learn from others</td>
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Conclusions
Big data requires and supports a coordinated approach within the whole railway industry

Working together

- Is there an opportunity to establish a platform to enable an open exchange about the future development of digitalisation, big data, modelling?
- Discuss challenges such as leadership, organisation, implementation and change
- Support the development of an agile data and digitalisation strategy
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